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US EPA RECORDS CENTER REGION 5



417656

Mr. Michael Berkoff
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USEPA Region 5
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Chicago, IL 60604-3507

Subject:

Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Willow Boulevard/A-Site Landfill Operable Unit 2
Responses to Draft Comments on the Preliminary Design Report

Dear Mr. Berkoff:

On behalf of Georgia-Pacific LLC (Georgia-Pacific), please find attached a set of responses to the draft comments provided by USEPA and MDNRE on the Willow Boulevard/A-Site Landfill Operable Unit 2 Preliminary Design Report (WB/A-Site OU Preliminary Design Report) and draft Construction Drawings. These comments were provided to Georgia-Pacific and ARCADIS on August 4, 2010 and August 17, 2010, respectively.

Based on our discussions following the August 12 and August 25, 2010 project team meetings, it is our understanding that USEPA will be providing a formal letter of response to the WB/A-Site OU Preliminary Design Report submittal following receipt and review of the attached responses to comments.

If you have any questions on the attached document, please do not hesitate to contact me

Sincerely,

ARCADIS

Pat McGuire
Project Coordinator

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GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
WILLOW BOULEVARD/A-SITE LANDFILL OPERABLE UNIT 2 REMEDIAL DESIGN

**RESPONSES TO USEPA/CH2M HILL'S AUGUST 4, 2010 DRAFT COMMENTS ON THE
WILLOW BOULEVARD/A-SITE LANDFILL OPERABLE UNIT 2
PRELIMINARY DESIGN REPORT, JULY 2010**

USEPA/CH2MHILL Specific Comment 1:

Several elements required in the Statement of Work presented in the Consent Decree are not present in this document. These include:

- *Required specifications in outline form*
- *A description of equipment to be employed, including capacity, size, and materials or construction*
- *While the seeding and planting plans, including species lists are present in the document, the proposed source of materials, planting density and configurations, timing, and performance measures through the initial establishment of vegetations (3 years) are not.*
- *Cut and fill volume determinations and suitability analysis of fill material*

Some elements required in the Statement of Work are present in the document but should be referenced more specifically for ease of comparison. These include:

- *A USEPA approved scientifically valid indicator of wetland characterization for use in determining sediment cleanup levels*
- *An analysis statement (or defense) regarding long-term monitoring of the mitigation site(s). This statement will be supported by the appropriate models.*

Response:

The following are provided in response to each of the bulleted comments:

- An outline list of specifications was provided in Section 4 of the Preliminary Design Report. Full draft specifications will be provided as part of the Pre-Final Design Report. (Note: This approach was approved by USEPA and MDNRE in the meeting held August 12, 2010).
- It is intended that the majority of the work will be performed by excavators, bulldozers, loaders, and a crane. A list of equipment and relevant descriptions will be provided in the Pre-Final Design Report.
- Details of the proposed planting configurations, performance measures, and material sources will be provided in the Pre-Final Design Report. It is currently anticipated that planting materials will be sourced from a local nursery such as JF New, the company that has provided both materials and labor for the recent Plainwell and Plainwell No. 2 Dam Time-Critical Removal Actions.
- An appendix will be included in the Pre-Final Design Report providing calculations of the cut/fill volume determinations along with confirmation that the excavated material can be accommodated within the planned final grade of the landfills. The Pre-Final Design Report will also provide a suitability analysis, which will include a discussion of the geotechnical suitability of the fill material.
- An inundation study is no longer required due to the application of the 0.33 mg/kg criterion to the four areas located outside the cap (not including the Area near Monitoring Well AMW-3A, where the cleanup criterion is 6.5 mg/kg).

- An analysis statement regarding the effectiveness of long-term monitoring efforts, along with documentation of the appropriate support, will be included in the Pre-Final Design Report.

USEPA/CH2MHILL Specific Comment 2:

Section: 2.1.7

Typically wetland delineations are only valid for 5 years, discuss whether the 1993 wetland evaluation and delineation is valid for this remedial action.

Response

Discussion of the validity of the existing wetland delineation (including discussion of the wetland survey that was performed in May 2010) will be included in the Pre-Final Design Report.

USEPA/CH2MHILL Specific Comment 3:

Section: 4.2.2

"All material excavated....from the Willow Boulevard Drainageway will be...consolidated at the Willow Boulevard Landfill". Section 1.4 of the ROD states that this material will be relocated to the A-Site Landfill. Please explain the discrepancy.

Response

The disposal criteria set out in the ROD were based on the results of the Focused Feasibility Study (FFS) for the OU, which was finalized in 2004. The FFS assumed a total removal volume of approximately 14,000 cy, with approximately 6,000 cy coming from Willow Boulevard Landfill. After the Consent Decree was finalized and the Preliminary Design completed, the total removal volume was revised, and is now estimated at 100,000 cy, with approximately 13,000 cy from the Willow Boulevard Landfill. The increased volume makes disposal in both landfills a much more practical option.

The current design includes the consolidation of approximately 87,000 cy in the A-Site Landfill and 13,000 cy in the Willow Boulevard Landfill. Addition of these volumes will result in an approximately 6.5-foot increase in height at both A-Site and Willow Boulevard (including a cover thickness of 3.5 feet and grading required to comply with regulation) resulting in peak elevations of 803.3 feet and 781.5 feet, respectively. If all 100,000 cy of excavated material – including the 13,000 cy from Willow Boulevard – were consolidated at the 3-acre area available at A-Site, there may be no increase at the high point as there are other areas of the landfill that could be filled in (particularly on the western side of the landfill); however the height at Willow Boulevard Landfill would still increase by at least 3.5 feet due to the thickness of the final cover system and potentially more to incorporate the grades required for stormwater management.

Three other project elements related to consolidation location that do not appear to be fully considered in the FFS and ROD are worker safety, potential adverse environmental impacts, and the construction schedule. Currently, the construction schedule is based on conducting remedial actions at the Willow Boulevard Site during the first construction season and A-Site in the second. Closing the Willow Boulevard Landfill first has been identified to be the safest, and most cost-effective approach to cleanup activities in that part of the OU. If it became necessary to transport material excavated from Willow Boulevard over to A-Site, the limited access between the two areas (i.e., the one-lane bridge over Olmstead Creek) could present issues associated with worker safety. Approximately 650 round trip truck loads would be required to transport 13,000 cy (using a 20 cy capacity dump truck) from Willow Boulevard to A-Site. Maintaining two-way traffic in areas where there might be limited site distances and rough terrain would increase the potential for vehicle accidents, increasing the potential for injuries to site workers. These risks are

manageable, but would be in addition to potential risks associated with disposal approach described in the Preliminary Design Report.

Disposing materials at Willow Boulevard will reduce the amount of time both disposal areas are open to the weather and thereby reduce adverse environmental impacts of the remedial action relative to the alternative. Having both landfills open for longer than necessary essentially doubles the stormwater management issues and increases the potential for leachate generation due to contact between stormwater and residuals. The potential for air transport of dust and PCBs from the additional truck traffic would also increase.

Given potential weather conditions and traffic congestion at the Olmstead Creek bridge (only one truck would be able to pass over the bridge at a time), it may take upwards of 30 minutes to safely complete one round trip. This could potentially add over 300 hours (five to six weeks) to the construction schedule, which may hinder the ability to complete the closure of Willow Boulevard in one construction season.

USEPA/CH2MHILL Specific Comment 4:

Section: 4.3.1

Please confirm that the 33% slopes presented on the north and east berm side slopes are correct.

Response

The 33% slopes are included only on the northern and eastern perimeter berms of the A-Site Landfill. It is not anticipated that the cover system will be extended along the 33% slope because residuals have not been identified in the perimeter berm adjacent to the Kalamazoo River and Davis Creek.

USEPA/CH2MHILL Specific Comment 5:

Section: 4.3.2

Please address the validity of the slope stability calculations for intermediate construction conditions, or, alternatively, provide calculations showing the adequacy of the intermediate conditions.

Response

Slope stability calculations provided in the Preliminary Design submittal present only the proposed final build-out conditions. Further calculations to address intermediate slope stability conditions will be provided in the Pre-Final Design Report.

USEPA/CH2MHILL Specific Comment 6:

Section: 4.4.1

Please address temporary surface water conveyance during construction.

Response

Temporary surface water conveyance during construction will be addressed in the Pre-Final Design Report.

USEPA/CH2MHILL Specific Comment 7:

Section: 4.4.2.2

Appendix E contains soil erosion calculations for the landfill cover; please clarify the location of the calculations for soil erosion in the 100-year floodplain or add these calculations to Appendix E.

Response

Calculations for soil erosion in the 100-year floodplain will be included in the Pre-Final Design Report.

USEPA/CH2MHILL Specific Comment 8:

Section: 4.6.2

The discussion on material dewatering needs to relate the required material properties of the excavated materials (post dewatering and after rework) to the assumptions in the global slope stability calculations

Response

As discussed in the response to Specific Comment 1, a suitability analysis of excavated materials will be included in the Pre-Final Design Report.

USEPA/CH2MHILL Specific Comment 9:

Section: 4.6.2

Significant amounts of water will be encountered in the excavations; the discussion in this section should include an estimate of volumes and proposed construction mitigation for these predicted volumes.

Response

The anticipated volume of water encountered during construction (along with proposed mitigation measures) will be evaluated and presented in the Pre-Final Design Report.

USEPA/CH2MHILL Specific Comment 10:

Section: 4.10

Please include the location of the proposed chain-link fence in the drawings and include construction details for the fence (including warning signs, gates, etc.) in the design drawings.

Response

The proposed chain link fence and associated construction details will be included in the Pre-Final Design Report.

USEPA/CH2MHILL Specific Comment 11:

Section: 6.1

Please review that the substantive portions of Act 451 Part 31 are not applicable; while excavated materials are not being placed in the floodplain, some fill is proposed in the flood plain, which would seem to indicate that the applicable statutes are relevant.

Response

Act 451 Part 31 has been reviewed, and as outlined in the Preliminary Design Report, it is not anticipated that any areas within the floodplain will be filled above existing grade and no net loss

of floodplain storage is anticipated; therefore, the statute does not appear to be applicable to the work proposed at the OU. This will be confirmed and clarified in the Pre-Final Design Report.

USEPA/CH2MHILL Specific Comment 12:
Section: 7.2.2

Please include an additional section describing the activities and requirements that need to be met at the conclusion of the remedial action.

Response

Long-term maintenance and post-closure care implemented as part of the remedy will be described in the Operation and Maintenance Plan (O&M Plan) for the project that is required to be submitted as part of the Final Design Report. An additional section will be added to the Pre-Final Design Report summarizing SOW requirements and proposed actions.

USEPA/CH2MHILL Specific Comment 13:

The 100-year floodplain is an important design and regulatory feature; please add this feature to plan views, sections, and details.

Response:

The 100-year floodplain will be added to relevant plans, sections, and details in the Pre-Final Design Report.

USEPA/CH2M HILL Specific Comment 14:
Construction Drawing 4

The contours on the northeast side of the A-site landfill (as you turn the corner from the north slope to the east slope) seem to be to greater than "approx. 20%" as stated on the cross-section. Is this the design intent?

Response

The grading on the northeast corner of A-Site Landfill has been reviewed, and that portion of the grading is greater than 20%. All slopes will be less than or equal to 25% as required by Part 115, and will be defined in future design submittals as "Max 25%," as shown within the final cover areas presented Construction Drawing 11, Final Grading and Stormwater Management Plan. The cross section on Construction Drawing 4 will be clarified to be consistent with Construction Drawing 11.

USEPA/CH2M HILL Specific Comment 15:
Construction Drawing 6

At locations on both landfills it seems that gas vents are missing from a few locations where you would expect them based on spacing presented on this sheet (just east of the Willow Blvd. Landfill text on Willow and north of the 800 contour on the A-Site Landfill). Please address this inconsistency.

Response

Gas vent spacing was biased towards areas where it is anticipated that the greatest gas migration may occur, specifically along proposed lateral gas collection pipes. The Pre-Final Design Report will provide that in addition to the biased placement of the vents, the minimum spacing requirement of 1 gas vent per acre of final cover area will be maintained.

USEPA/CH2M HILL Specific Comment 16:

Construction Drawing 7

Please show the existing groundwater wells that will be included as part of the final groundwater monitoring network on this plan

Response

It is anticipated that all existing groundwater wells will be abandoned prior to start of construction, as discussed in Section 4.5 of the Preliminary Design Report.

USEPA/CH2M HILL Specific Comment 17:

Construction Drawing 10

Note 3 indicates backfill will be excavated material from other areas of the site; Section 2 shows that some backfill will occur outside of the landfill cap on the northern slope. Please amend this note to state that impacted material must be relocated within the landfill footprint.

Response

Note 3 on Sheet 10 will be revised to state that all residuals excavated from the OU will be relocated beneath the final cover system. Backfill material placed outside the landfill cap will be provided by off-site fill sources.

USEPA/CH2M HILL Specific Comment 18:

Construction Drawing 11

Although the calculations show that the maximum undrained collection pipe length is 556 feet, it doesn't seem prudent to install the toe drain pipe at that spacing.

Response

The collection pipe will be drained at least every 556 feet based on the Final Cover System Geocomposite and Collection Pipe Design provided in the appendices. This distance conservatively assumes a pipe full flow rate and a design transmissivity of the geosynthetic drainage composite (GDC) that considers a combination of reduction and overall design safety factors. Although 556 feet is a maximum undrained pipe length distance, the pipes will be drained regularly at a shorter interval, which will be determined during development of the Pre-Final Design Report.

USEPA/CH2M HILL Specific Comment 19:

Slope Stability - Please confirm that section A2 is the maximum case; it seems that the northeast slope might have a steeper slope near the top of the final cover.

Response

The grading on the northeast corner of A-Site Landfill has been reviewed, and a slope stability section will be provided through this area as part of the Pre-Final Design Report, in addition to the current sections.

**RESPONSE TO MDNRE'S AUGUST 17, 2010 DRAFT COMMENTS ON THE
WILLOW BOULEVARD/A-SITE LANDFILL OPERABLE UNIT 2
PRELIMINARY DESIGN REPORT, JULY 2010**

MDNRE Comment 1:

As identified in Section 1 Excavation of the 2009 Consent Decree Statement of Work (SOW), the "Settling Defendant shall excavate the Willow Boulevard Drainageway, the Area South of the A-Site Berm, the Area East of Davis Creek, and the former Olmstead Creek Area to the remedial action goal of 0.33 ppm PCB. The areas to be so excavated are delineated on Figure 2 of the ROD. The Settling Defendants shall excavate these four areas to the 0.33 ppm PCB cleanup goal;..." Based on Figures 2-1, 2-3, 2-4, and 4-1, select portions of the Willow Boulevard Drainageway, the Area South of the A-Site Berm, and former Olmstead Creek Area has been designated as wetlands and will be excavated to the 0.33 ppm cleanup goal and any other portions will be excavated to meet a 6.5 ppm PCB cleanup goal. As indicated above, the Settling Defendants have agreed to excavate the entire Willow Boulevard Drainageway, the Area South of the A-Site Berm, the Area East of Davis Creek, and the former Olmstead Creek Area to the remedial action goal of 0.33 ppm PCB. The Preliminary Design Report and Construction Drawings do not reflect this agreement of the Consent Decree.

Response:

The application of the 0.33 mg/kg criterion was discussed in a teleconference held with USEPA and MDNRE on August 25, 2010. ARCADIS and Georgia-Pacific agreed that all areas within the Willow Boulevard Drainageway that are not managed by capping would be excavated to a cleanup criterion of 0.33 mg/kg. The agreement to apply this number to a larger area than described in the Preliminary Design Report does not constitute Georgia-Pacific's concurrence with USEPA or MDNRE that it is appropriate to apply a sediment criterion to upland soils for any reason, nor does it signify concurrence with USEPA or MDNRE concerning the application of this criteria to soils. Georgia-Pacific does not believe the application of the 0.33 mg/kg sediment criterion to soils is technically valid.

The attached figure shows the updated proposed excavation areas and limits of the cap within the Willow Boulevard Drainageway, assuming excavation to a 0.33 mg/kg criterion. The revised extent of excavation includes one additional area around sample location WB09-09 that was previously excluded based on application of the 6.5 mg/kg criterion, as the maximum PCB concentration in this sample is 0.59 mg/kg. The extent of excavation may also be revised as applicable in the Pre-Final Design Report.

As requested, Section 3.1.1.1 has been revised to reflect the above as follows:

As described in the Remedial Design Work Plan for the OU (RD Work Plan; ARCADIS 2010a), soil remediation is anticipated to occur primarily on property owned by Georgia-Pacific that is zoned for light industrial use – as a result, the Part 201 Generic Residential Land Use Criterion of 4 mg/kg for PCBs in soil is not a basis of design for the remedial action. The PCB criterion that is the basis of design for the Willow Boulevard Drainageway, the area south of the A-Site berm, and the area east of Davis Creek is the sediment cleanup criterion of 0.33 mg/kg, as stated in the ROD. For the area near monitoring well AMW-3A, the basis of design is 6.5 mg/kg PCB, which is the lower end of the No Observed Adverse Effect Level range identified above.

Considering the 0.33 mg/kg criterion may be difficult to achieve, it is the understanding of Georgia-Pacific and ARCADIS that if USEPA determines that the 0.33 mg/kg PCB remediation goal has not been achieved in a particular area, USEPA will consult with MDNRE and Georgia-Pacific regarding (1) whether additional remedial actions will be effective in achieving the 0.33

mg/kg remediation goal in the area; and (2) the potential nature of such additional remedial actions. Additional remedial actions to be considered include, but are not limited to: (1) additional excavation; (2) backfilling with clean material; (3) capping; and (4) monitored natural attenuation. In determining whether and how to proceed with additional remedial activities, USEPA will consider the extent and concentration of the remaining PCBs in the area(s).

MDNRE Comment 2:

As identified in Section 1.1 Setback from Kalamazoo River at the Willow Boulevard Landfill of the SOW, "The excavation along the northern banks of the Willow Boulevard Landfill (along the Kalamazoo River) shall be of sufficient distance to create an adequate buffer zone, which ensures that, for the lifetime of the remedy, there is no direct contact between the contaminated residuals within the landfill and the Kalamazoo River. This buffer will also be adequate to prevent PCBs from migrating (by surface water runoff or erosion) from the landfill into the Kalamazoo River. The excavated areas shall be backfilled with clean soil with sufficient organic content to support restoration planting materials and to create an ecologically friendly bank. Additionally, this buffer zone or setback shall be of sufficient size to allow for the installation of and access to groundwater monitoring wells." The preliminary design presented in the Preliminary Design Report and Construction Drawings do not meet this requirement of the SOW.

Response:

To prepare the northern and western slopes of Willow Boulevard for the proposed cover system, it will be necessary to excavate a minimum of 14 feet horizontally back from the edge of the Kalamazoo River (to get down below the base of existing paper-making residuals). In doing so, approximately 6,500 cy of material – including, to a practical extent, all residuals in this 14-foot buffer zone – will be removed from around the northern perimeter of the Willow Boulevard Landfill adjacent to the Kalamazoo River. This excavation will allow for the 3.5-foot thick cover system to be laid at a slope of 25% along the perimeter and the placement of approximately 6,000 cy of clean fill. The proposed final slopes of the northern and western perimeter of the Willow Boulevard Landfill will be able to accommodate equipment to install and access the necessary groundwater monitoring wells – the ability to successfully work on slopes of 25% was proven during the pre-design investigation boring installation along the northern berm. This is described in more detail below.

The buffer zone created by excavation to the required slopes will create a zone approximately 14 feet wide along the river that will be free of residuals. The cover system, which will be constructed over the regraded slope as well as the materials excavated and consolidated in the center of the landfill, will include 12 inches of sand, an impermeable membrane, geosynthetic drainage composite, 24 inches of soil and stone, and a 6-inch vegetative soil layer. The cover system will provide an impermeable barrier between the Willow Boulevard Landfill and the Kalamazoo River, and is designed to achieve the objectives of ensuring "no direct contact between the contaminated residuals in the landfill and the Kalamazoo River" and preventing erosion and runoff of PCB-containing paper-making residuals into the river, as described in the ROD and SOW.

To address the collection of representative groundwater samples from the wells installed along the northern and western perimeter of Willow Boulevard, the use of double-cased wells is proposed. Double-cased groundwater monitoring wells will be installed in a manner similar to that used for other wells (i.e., WMW-3A) installed through paper-making residuals at the Willow Boulevard Landfill during the Remedial Investigation (RI). No PCBs were detected in two rounds of groundwater samples collected from WMW-3A during the RI in 1996 and 2000, proving the double-case technology can accommodate installation of monitoring wells through paper-making residuals. USEPA stated a concern that installation of monitoring wells through paper-making residuals may compromise the interpretation of groundwater sample results; however, no specific

rationale was explained. ARCADIS believes the available data for the OU specifically and the Site in general provide proof of the reliability of this approach – double-cased wells have been installed and monitored successfully at numerous locations at the landfill OUs of the Superfund Site. Further, if there were a detection of PCBs at a double-cased well believed to be associated with the temporal impacts of well construction, this result could be differentiated by completing a trend analysis of the data.

During the teleconference with USEPA and MDNRE on August 25, 2010, USEPA expressed concern that the proposed approach for construction of the buffer zone was not consistent with the ROD, and that it would not allow installation of reliable monitoring wells. ARCADIS asserts that the construction approach as described is consistent with the ROD. The ROD does not require a particular size, shape, or configuration of the buffer zone. Nor does it state that the monitoring wells cannot pass through residuals, rather the ROD only requires that the buffer be sufficient to allow installation of the wells and future access to the wells. The configuration as proposed in the Preliminary Design Report provides an adequate buffer zone to satisfy the requirements of the ROD.

ARCADIS has evaluated several alternative approaches to address the agency's concerns about installing the groundwater wells through paper-making residuals. These alternatives include the following:

- Localized excavation and clean backfill only around the proposed groundwater monitoring wells, with the cover system being retained along the full slope. In this option, it is likely that the monitoring wells would be moved downslope to minimize the additional excavation volumes, and it is estimated that an additional 1,000 to 2,000 cy of material would need to be removed. This option has several drawbacks. First, established groundwater flow pathways would be changed. Preferential pathways to groundwater may result from backfilling the excavations with a material having a higher hydraulic conductivity property than paper-making residuals. Another issue is the complications associated with excavation below the water table. A portion of the excavated material would be taken from below the water table to reach the approximate bottom of residuals in this area. It is well established that excavating below the water table causes mixing between materials targeted for removal and native materials. This creates uncertainty as to the nature and extent of residuals after excavation, and may unintentionally expand the affected area. Additional problems arise with the management of river water, stormwater, and leachate that could collect in the open excavation. The management of water collected in the open excavation would further mix/disturb the base of the excavation and potentially impact the clean soils installed during backfilling operations.
- Excavation back from the shoreline by varying distances along the perimeter of the Willow Boulevard Landfill, and backfilling to achieve a 3:1 slope to top of berm (in this option the cover system would terminate at the top of the berm). As with the previous option, the groundwater monitoring wells would likely be moved downslope to minimize excavation. It is estimated that this option would still result in the excavation of an additional 8,500 cy of material, which would have cost and schedule implications for the project. Similar to the localized excavation option, the existing groundwater flow paths will be altered, excavation would need to be performed down below the water table (thus raising issues of mixing between impacted and non-impacted materials), and there would be an increased need to manage and control river water, stormwater, and leachate.

In contrast to the situation at A-Site, where berms were constructed for dewatering lagoons thus establishing a 'clean' buffer before the placement of paper-making residuals was initiated, Willow Boulevard Site was created by placing paper-making residuals within a backwater area of the Kalamazoo River. Over time, the paper-making residuals (not all of which contain measureable levels of PCBs) have become stable, and based on the results of the Remedial Investigation, we have an understanding of the nature and extent of PCB impacts. To disrupt this setting alters our understanding of the nature and extent of PCB-impacted materials, creates unnecessary uncertainties, and potentially could expand the extent of PCB into areas that are not currently affected.

Although both of the above options may be viable to incorporate into the design, Georgia-Pacific and ARCADIS assert that the current conditions at Willow Boulevard Site are stable and should not be disturbed. The installation of monitoring wells into unknown subsurface conditions has a greater potential to compromise the interpretation of groundwater data than the installation of double-cased monitoring wells through delineated residuals. Furthermore, ARCADIS believes that it is more reliable to monitor beneath the established interface between waste and native materials as proposed in the Preliminary Design Report.

Georgia-Pacific and ARCADIS believe the current design meets the intent of the setback as described in the ROD and SOW, which is to: 1) isolate the paper-making residuals from the River, 2) prevent erosion and run-off of PCB-containing materials, and 3) provide for the installation and access of monitoring wells. The current design adequately meets these requirements.

MDNRE Comment 3:

The Preliminary Design Report references the discharge of water to the Kalamazoo River including treated drainage water, wash water, and storm water resulting from the gravity drainage and consolidation of excavated materials. These types of discharges will require a Substantive Requirements Document (SRD) from the DNRE. It will be necessary for the PRPs to work directly with the Division that oversees these types of discharge to obtain an SRD in advance of the anticipated field start date as to not delay the remedial action.

Response:

An application for a SRD will be submitted to MDNRE prior to construction. Further information regarding the SRD will be provided in the Pre-Final Design Report.

MDNRE Comment 4:

Section: 1.2

This section needs to include, by specific reference, that the former Olmstead Creek is considered to a part of the Area South of A-Site Berm.

Response

As requested, text will be included in the Pre-Final Design Report to explain that the former Olmstead Creek is considered a part of the Area South of A-Site Berm.

MDNRE Comment 5:

Section: 1.2.2.1

This section references a culvert between the Willow Boulevard and A-Site landfills that discharges storm water to the Kalamazoo River from the former Olmstead Creek drainage way. This section does not identify if the culvert will remain in place as a part of the remedial design.

Response

It is anticipated that this culvert will remain in place as part of the remedial design. This will be further clarified in the Pre-Final Design Report.

MDNRE Comment 6:**Section: 1.4**

This section states that the construction drawings will include all technical specifications to complete implementation of the remedy. The Construction Drawings do not include any technical specifications other than seeding specifications. It is not acceptable to omit specifications for materials, construction and installation methods, data requirements and collection methods, field engineering, etc. Technical specifications need to be developed to adequately describe the work to be completed.

Response

While certain technical specifications will be included on later versions of the Construction Drawings, a separate set of technical specifications included in the Pre-Final Design Report will present all the details requested in this comment. The text will be revised in the Pre-Final Design Report to refer to this separate set of technical specifications.

MDNRE Comment 7:**Section: 2.1.5**

This section references perched leachate at A-Site near monitoring wells AMW-6P, AMW-7P, AMW-9P, and AMW-10P. It is unclear if the perched leachate was accounted for during slope stability calculations and if perched leachate will be removed as a part of this remedial design implementation.

Response

Perched water at the A-Site Landfill was not accounted for during Preliminary Design slope stability calculations; however, the condition will be further reviewed and its applicability will be assessed as part of the development of the Pre-Final Design Report. Perched water was not removed at other OUs of the Superfund Site, and it is not anticipated to be removed for the WB/A-Site OU project unless required for slope stability.

MDNRE Comment 8:**Section: 3.1.1.1**

This section indicates that two different PCB criteria will be used throughout OU2. This section should include a reference map to outline which criterion is applicable to which areas of the OU.

Response

A map outlining the relevant criterion in each area of the WB/A-Site OU will be included in the Pre-Final Design Report.

MDNRE Comment 9:

Section: 4

This section indicates a three year post-construction monitoring and maintenance period for seeded and planted areas. A three year period may not be adequate and USEPA should consider a minimum monitoring and maintenance period of five years.

Response

The 3-year post-construction monitoring and maintenance period is cited in the SOW. However, Georgia-Pacific will include a 5-year post-construction monitoring and maintenance period in the Pre-Final Design Report.

MDNRE Comment 10:

Technical specification sections for monitoring well installation and materials, gas vent and probe installation and materials, field engineering, waste consolidation, monitoring well abandonment, turf establishment, and decontamination have not been identified in this section. These technical specifications are necessary to adequately complete the remedial action.

Response:

Specifications related to the topics MDNRE cited will be included in the Pre-Final Design Report.

MDNRE Comment 11:

Section: 4.2.2

This section identifies that materials excavated from the northern and western banks of the Willow Boulevard Landfill and the Willow Boulevard Drainageway will be consolidated at the Willow Boulevard Landfill. The ROD (Section 9.1.2 Alternative 2- Consolidation and Containment of Select Materials) states "Under Alternative 2, approximately 13,800 cyd of PCB-contaminated residual, soil, and/or sediment would be excavated from the Willow Boulevard Drainageway, the Area South of the A-Site Berm (including Former Olmstead Creek), the Area East of Davis Creek, and the area near monitoring well AMW-3A, and consolidated with existing residuals at the A-Site Landfill." The preliminary design presented in the Preliminary Design Report and Construction Drawings do not meet this requirement of the ROD.

Response

Please see the response to USEPA/CH2MHILL Specific Comment 3:

MDNRE Comment 12:

Section: 4.3.3

This section fails to acknowledge Part 91 Soil Erosion and Sedimentation Control and Part 31 Water Resources Protection of the Natural Resource and Environmental Protection Act, Public Act 451, of 1994 as amended as applicable or relevant and appropriate requirements. Additionally this sections needs to identify how the substantive requirements of Part 91 and Part 31 will be addressed.

Response

An additional section discussing Part 91 and Part 31 of the NREPA will be included in the Pre-Final Design Report to clarify how the substantive requirements of these regulations will be met.

MDNRE Comment 13:

Section: 4.5

This section indicates that each two-well cluster will consist of one shallow well screened across the water table and a deeper well screened to intercept flow approximately ten feet below the bottom of the shallower well. Part 201, Environmental Remediation, of the NREPA, requires groundwater/surface water interface monitoring to monitor the zones representative of the highest concentrations of contaminants. To adequately determine the zones representative of the highest concentrations of contaminants, vertical aquifer sampling (VAS) will be necessary, at least for the upper 30 feet of the aquifer. A five-foot interval for VAS is recommended for adequately placing monitoring wells in the upper 30 feet of aquifer at this site. A ten-foot profile interval may be used at greater depths (instead of five-foot intervals), unless contamination or the presence of low permeability units indicates otherwise. The groundwater samples collected from VAS should be analyzed for the metals target analyte list (TAL), mercury, cyanide, PCBs, dioxins, furans, semivolatile compounds target compound list (TCL), and volatile organic compounds (VOCs) TCL.

Response:

Georgia-Pacific and ARCADIS do not plan on performing VAS based on our understanding of subsurface conditions, as established through completion of the RI and Pre-Design Investigation. The RI and Pre-Design Investigation results indicated that the stratigraphy across the OU is relatively consistent, with 75 feet of sand containing intermittent thin peat layers. By installing two wells at each monitoring location, with one well screened at the water table and the second screened ten feet below the water table well screen, the proposed network will monitor groundwater flowing from the proximity of the residual material toward the river. This monitoring approach has been successfully demonstrated at the King Highway Landfill OU, where VAS was not performed to aid in well placement. The Pre-Final Design Report will include further discussion on how monitoring wells will meet the requirements of Part 201, specifically related to the issue of screening wells in areas of contamination. Contingency actions could include installation of deeper monitoring points if needed based on initial sampling data.

In addition, the proposed monitoring program has been designed to build upon the existing OU database, focusing on those analytes previously detected, believed to be associated with the residuals, and presenting potential risks to human health or the environment. Comprehensive analyses were performed during the RI, and based on the results, only PCBs were identified as a constituent of concern.

MDNRE Comment 14:

Water table wells should be constructed with five foot screens set with one foot above the normal water table or with seven foot screens set a minimum of two feet above the normal groundwater elevation.

Response:

Georgia-Pacific and ARCADIS agree to install the water table wells with a maximum of five feet of saturated well screen at the time of installation. This detail will be included in the Pre-Final Design Report

MDNRE Comment 15:

This section indicates that if residuals are encountered at a monitoring well location, the corresponding well or wells will be installed a minimum of five feet below the base of the encountered residuals to reduce the likelihood of future groundwater sampling events detecting artificially mobilized contaminants. To monitor the zones representative of the

highest concentrations of contaminants, it may be necessary to place monitoring wells in residual waste or downgradient of residual waste to determine compliance with Part 201. It may not be appropriate to install wells screened below the base of the encountered residuals, unless that is the zone representative of the highest concentration of contaminants.

Response:

Based on the conceptual model of groundwater flow at the OU, there is generally a downward gradient from the residual material to the underlying natural deposits; however, groundwater flow is limited by the low hydraulic conductivity of the paper residuals. Groundwater that ultimately reaches the base of the residuals then moves toward the river with a continuing downward component of flow. ARCADIS believes that by screening wells that need to be advanced through residual material 5 feet below the base of the residuals, representative groundwater samples will be obtained, while the potential to sample groundwater that contains particulate material that has been mobilized by the drilling and sampling methods will be minimized.

Advancing the wells to 5 feet below the base of residuals (if necessary) will also allow for the grouting of an outer casing to isolate the screen from particulates artificially mobilized by the drilling process. This approach will minimize the likelihood of collecting samples that have been impacted by the drilling and sampling processes yet allow collection of samples from directly below the residuals where the greatest impacts to groundwater quality would be anticipated to be observed.

MDNRE Comment 16:

Figure 7-1

Figure 7-1 shows 30 days review time for the Pre-Final Design Documents by the USEPA. Please be advised that DNRE will require a minimum of 60 days to provide a sufficient review of the Pre-Final Design Documents, as many details of the remedial design have not been provided in the Preliminary Design Documents.

Response

Georgia-Pacific and ARCADIS understand that additional flexibility may be required for Pre-Final Design review time; however the amount of review time for MDNRE needs to be coordinated with USEPA.

MDNRE Comment 17:

The Performance Standards Verification Plan should include a process that involves the USEPA and DNRE in determining post-excavation verification sampling locations and should meet all the requirements of the Michigan Department of Environmental Quality Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria, 2002.

Response:

Additional detail on the involvement of USEPA and MDNRE in post-excavation verification sampling design will be included in the Pre-Final Design Report.

MDNRE Comment 18:
Appendix G

The PSVP indicates that the groundwater samples will be submitted for laboratory analysis of PCBs. The Remedial Investigation/Focused Feasibility Study identified several contaminants above generic groundwater/surface water interface criteria. The groundwater samples collected for long-term monitoring should be analyzed for the metals TAL, mercury, cyanide, PCBs, dioxins, furans, semivolatile compound TCL, and VOC TCL.

Response:

Please see the response to MDNRE Comment 13.

MDNRE Comment 19:
Appendix G

The groundwater monitoring program should include an assessment of groundwater flow gradients before and during groundwater sampling activities. A condition of steady state flow from the landfill toward the Kalamazoo River for two weeks prior to and during the sampling event is recommended.

Response:

At the King Highway Landfill OU, the referenced protocol of monitoring water levels for a two-week period prior to sample collection has been followed throughout the course of seven years of sampling. Observations at King Highway have shown that brief gradient reversals occur (as would be expected) in response to increases in the river level. The reversals have been observed only in close proximity to the river, and typically occur over short periods of time. Periodic releases of water from upstream hydroelectric facilities cause water level increases of several feet that dissipate over the course of several days. With the exception of a potential flood event during which high surface water levels could persist for a longer time period, ARCADIS does not believe that groundwater samples are likely to be impacted by surface water level changes in the river.

To provide data to address MDNRE's concern, ARCADIS plans to include a period of monitoring of the river stage at the USGS gage at Comstock prior to each planned sampling event. In the event of a rise in the river elevation above 761.5 feet at the USGS gage at Comstock for a duration of four or more days in the week prior to a planned sampling event, additional efforts would be undertaken to document conditions at the OU. Local groundwater elevation and surface water elevations would be measured, and the sampling event would be postponed if a satisfactory flow gradient toward the river could not be documented.

MDNRE Comment 20:
Appendix G

The PSVP includes a proposal to reduce sampling from quarterly to annually after two years. Any reduction from a quarterly sampling schedule should be considered and evaluated by the USEPA and the DNRE before being implemented.

Response:

ARCADIS agrees that any proposed changes in the scope or schedule of the sampling program would be submitted as a proposal to USEPA and MDNRE for review prior to implementation.

MDNRE Comment 21:

As identified in Section 4 of the SOW, the draft Construction Quality Assurance Project Plan shall be submitted with the preliminary design, the Preliminary Design Report does not meet this requirement of the SOW as only a preliminary outline of the Construction Quality Assurance Project Plan has been provided.

Response:

The requirements outlined in the ROD/SOW on this point are somewhat inconsistent (Section 3 of the SOW does not include a requirement for the CQAP at the Preliminary Design stage, but Section 4 does) and ARCADIS understood that the draft CQAP could be provided at the Pre-Final Design stage. In addition, the Remedial Design Work Plan for the project states that the CQAP will be submitted with the Pre-Final Design Report. As such it is proposed that the draft CQAP will be provided with the Pre-Final Design Report.

MDNRE Comment 22:

Sheet 5

This sheet does not include the lateral bottom slope of the swales that collect and direct storm water to the downchutes. A complete evaluation of the swales cannot be completed at this time.

Response:

The requested details are provided in the Preliminary Design Report; however, not all are included on Construction Drawing 5. Construction Drawing 5 shows the location of the proposed drainage benches (i.e., the swales) and flow direction. In the legend, this location of the invert of these benches is defined and refers to Detail 3 on Construction Drawing 13. Detail 3 on Construction Drawing 13 defines the invert slope (i.e., the lateral bottom slope) of the drainage bench as 0.5% minimum. A complete evaluation of the drainage benches is provided in Appendix D-2 entitled "Drainage Bench Design."

MDNRE Comment 23:

Sheet 6

An additional gas vent may be necessary to adequately discharge landfill gases from the northeast end of the lateral gas collection pipe of the Willow Boulevard Landfill.

Response

Gas vent spacing was biased towards areas where it is anticipated that the greatest gas migration may occur, specifically along proposed lateral gas collection pipes. The Pre-Final Design Report will provide additional information to support that in addition to the biased placement of the vents, the minimum spacing requirement of 1 gas vent per acre of final cover area will be maintained.

MDNRE Comment 24:

Sheet 6

There are not any gas vent identified on the gas cutoff trench; however Sheet 17, Detail 4 indicates gas vents will be constructed in the gas cutoff trench.

Response

Construction Drawing 6 will be modified in the Pre-Final Design Report to include gas vents associated with the gas cutoff trench.

MDNRE Comment 25:

Sheet 7

The two southernmost wells on the east side of the A-Site Landfill should be relocated 100 to 120 feet to the north, to place the wells in an area projected to be down gradient of a larger mass of residual waste, once the remedial action is completed.

Response:

The southernmost well cluster proposed on the eastern side of the A-Site Landfill will be relocated as requested.

MDNRE Comment 26:

Sheet 7

The proposed location of the Willow Boulevard upgradient wells is too close to the landfill to be considered an upgradient monitoring location. The drainage area and the potential mounding of groundwater at the Willow Boulevard Landfill could result in site contaminated groundwater influencing the groundwater at this location. It is recommended to move this location to the south.

Response:

The upgradient wells on the southern side of Willow Boulevard will be located as far south as practicable while remaining on Georgia-Pacific property.

MDNRE Comment 27:

Sheet 7

Additional monitoring well locations may be necessary to monitor discharge of groundwater from the A-Site Landfill to Olmstead Creek. A monitoring well in the southern half of the A-Site Landfill compared to a staff gauge in Olmstead Creek could be used to determine if groundwater flows from the landfill to Olmstead Creek. If gradients exist toward Olmstead Creek, monitoring wells should be constructed along the creek for measuring compliance with groundwater/surface water interface criteria.

Response

Flow within Olmstead Creek is intermittent; however, the need for an additional staff gage will be evaluated prior to the submittal of the Pre-Final Design Report.

MDNRE Comment 28:

Sheet 8

This sheet indicates the landfill final cover for the Willow Boulevard Landfill to terminate at the northern riparian corridor, however Sheet 10, Cross Section 1 indicates the landfill cover to proceed down the slope to the elevation of the Kalamazoo River.

Response

The landfill cover extends down to the toe of slope as shown on Construction Drawing 10; however, the riparian corridor area will be planted in a different manner as compared to the majority of the upper portion of the landfill. Further clarification will be provided in the legend of Construction Drawing 8 to refer to "extent of landfill cover seed mix" in place of "extent of landfill cover."

MDNRE Comment 29:

Sheet 10

The cross sections identify that the waste and liner profile will be constructed with grade breaks and opposing slopes. This type of cover system design will be difficult to construct and difficult to verify achievement of design grades. An alternate approach of the waste and liner system being constructed without opposing slopes should be considered.

Response

Part 115 rules require that the final cover design adequately address final cover system erosion protection, infiltration, stormwater runoff, gas control, and slope stability. In addition to minimizing the potential for rill erosion by reducing the slope length for erosion control, the benches located on the final cover system provide for intermediate locations along the length of the landfill's side slopes for infiltration waters, stormwater runoff, and gas to be collected. Due to the size and slope length of the landfill, the benches provide additional means of stability for the final cover system and the overall global stability of the landfills. Similar grade breaks with opposing slopes have been successfully constructed at a multitude of various landfills, including the Bryant HRDL/FRDLs at the Allied Paper, Inc. OU. While this type of construction will require vigilance during construction to maintain grade control, the design is feasible and will provide the long-term benefits of increased erosion protection, improved slope stability, and the ability to collect infiltration water, stormwater, and landfill gas.

The configuration of the final cover system does ensure that design grades will be achieved in that the minimum slopes of 2% and maximum slopes of 25% of the landfill final cover system (as required by Part 115) will be maintained between grade breaks and across opposing slopes.

MDNRE Comment 30:

Sheet 12

This sheet shows the geosynthetic drainage composite material to be discharging into the anchor trench. The drainage of water into the anchor trench is not a preferable discharge point.

Response

Construction Drawing 12 shows three different configurations for the GDC adjacent to the limits of the final cover system. The drainage patterns for the GDC shown on the A-Site Berm sections (those shown in detail numbers 1 and 2) and on the Willow Boulevard Berm section (detail number 3) vary.

The GDC on the A-Site Southeast Berm Section (shown on detail 1) is graded at a 2% slope (between the lateral gas collection pipe adjacent to the geosynthetic anchor trench on the right side of the detail and the final cover collection pipe on the left side of the detail) as defined by the "← 2% MIN." callout above the GDC on that detail. In this area, the grade slopes away from the geosynthetic anchor trench, and therefore allows for infiltration water to be directed towards the final cover collection pipes located approximately below the perimeter ditch.

The GDC on the A-Site Eastern Berm (shown on detail 2) is graded parallel to the overlying access road. This grade slopes away from the geosynthetic anchor trench and therefore allows for infiltration water to be directed towards the final cover collection pipes located approximately below the perimeter ditch. The GDC material does not discharge to the anchor trench. This will be clarified by adding slope and direction arrows directly above the GDC on the drawing.

The Willow Boulevard Berm Section (shown on detail 3) is adjacent to the Kalamazoo River as shown on Construction Drawing 10. The GDC is graded at a 2% slope (between the lateral gas collection pipe in the central portion of the detail and the final cover collection pipe on the right

side of the detail) as defined by the “← 2% MIN.” callout above the GDC on that detail. This grade slopes away from the geosynthetic anchor trench and therefore allows for infiltration water to be directed towards the final cover collection pipes located approximately below the perimeter ditch.

Towards the left of the lateral gas collection pipe shown on detail 3, the final cover extends into a saturated zone (i.e., below the surface of the Kalamazoo River). Therefore, any water collected by the GDC will drain directly into restoration materials that are inundated by the Kalamazoo River. ARCADIS acknowledges that water will flow into the anchor trench on this particular berm section; however, we do not anticipate that this will have any significant adverse impact on the long-term performance/reliability of the cover.

MDNRE Comment 31:
Sheet 16

This sheet shows the subgrade downchute detail to carry storm water from the landfill cap to its discharge point. The design of an enclosed pipe system versus an open channel may present operation and maintenance difficulties for landfills without routine staff to monitor and maintain the downchute inlet pipes during storm events.

Response

The proposed design has been reviewed, and the anticipated volume of water from four mid-slope swales down a 25% slope along with the resulting shear stresses/ velocities of stormwater collected by the midslope swales that contribute to the downchute are all anticipated to be significant enough that the use of large downchute pipes will be required. Given these design considerations, the use of an open channel is not feasible. Additional design calculations related to this feature will be provided in the appendices to the Pre-Final Design Report, and relevant design details will be added to the Construction Drawings in the Pre-Final Design Report.

MDNRE Comment 32:
Sheet 16

Detail 1 on this sheet does not specify the pipe diameter. An evaluation of the pipe capacity cannot be completed at this time.

Response

Detail 1 was provided as part of the Preliminary Design Report to provide the preliminary configuration and intent of the downchute's design. Additional design calculations related to this feature will be provided in the appendices to the Pre-Final Design Report, and relevant design information will be added to this detail in the Pre-Final Design Report.

MDNRE Comment 33:
Sheet 17

The vertical penetrations shown on this sheet should be designed to allow for movement of the pipe (gas vent for example) as a result of vertical settling of the waste materials without inducing strain on the liner system.

Response

Although minimal settlement of the landfill is anticipated due to the long-term residence of the residuals, the vertical penetrations shown for the gas vents will be modified for the Pre-Final Design Report to show an allowance for movement of the pipe to minimize strain on the liner system.

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
WILLOW BOULEVARD/A-SITE LANDFILL OPERABLE UNIT 2 REMEDIAL DESIGN

**RESPONSES TO 3 MAJOR AGENCY COMMENTS ON THE
WILLOW BOULEVARD/A-SITE LANDFILL OPERABLE UNIT 2
PRELIMINARY DESIGN REPORT, JULY 2010**

Comment 1:

Section: 4.2.2

This section identifies that materials excavated from the northern and western banks of the Willow Boulevard Landfill and the Willow Boulevard Drainageway will be consolidated at the Willow Boulevard Landfill. The ROD (Section 9.1.2 Alternative 2- Consolidation and Containment of Select Materials) states "Under Alternative 2, approximately 13,800 cyd of PCB-contaminated residual, soil, and/or sediment would be excavated from the Willow Boulevard Drainageway, the Area South of the A-Site Berm (including Former Olmstead Creek), the Area East of Davis Creek, and the area near monitoring well AMW-3A, and consolidated with existing residuals at the A-Site Landfill." The preliminary design presented in the Preliminary Design Report and Construction Drawings do not meet this requirement of the ROD.

Response

The disposal criteria set out in the ROD were based on the results of the Focused Feasibility Study (FFS) for the OU, which was finalized in 2004. The FFS assumed a total removal volume of approximately 14,000 cy, with approximately 6,000 cy coming from Willow Boulevard Landfill. After the Consent Decree was finalized and the Preliminary Design completed, the total removal volume was revised, and is now estimated at 100,000cy, with approximately 13,000 cy from the Willow Boulevard Landfill. The increased volume makes disposal in both landfills a much more practical option.

Three other project elements that do not appear to be fully considered in the FFS and ROD are worker safety, potential adverse environmental impacts, and the construction schedule. Currently, the construction schedule is based on conducting remedial actions at the Willow Boulevard Site during the first construction season and A-Site in the second. Closing the Willow Boulevard Landfill first has been identified to be the safest, and most cost-effective approach to cleanup activities in that part of the OU. If it became necessary to transport material excavated from Willow Boulevard over to A-Site, the limited access between the two areas (i.e., the one-lane bridge over Olmstead Creek) could present issues associated with worker safety. Approximately 650 round trip truck loads would be required to transport 13,000 cy (using a 20 cy capacity dump truck) from Willow Boulevard to A-Site. Maintaining two-way traffic in areas where there might be limited site distances and rough terrain would increase the potential for vehicle accidents, increasing the potential for injuries to site workers. These risks are manageable, but would be in addition to potential risks associated with disposal approach described in the Preliminary Design Report.

Disposing materials at Willow Boulevard will reduce the amount of time both disposal areas are open to the weather and thereby reduce adverse environmental impacts of the remedial action relative to the alternative. Having both landfills open for longer than necessary essentially doubles the stormwater management issues and increases the potential for leachate generation due to contact between stormwater and residuals. The potential for air transport of dust and PCBs from the additional truck traffic would also increase.

Given potential weather conditions and traffic congestion at the Olmstead Creek bridge (only one truck would be able to pass over the bridge at a time), it may take upwards of 30 minutes to

safely complete one round trip. This could potentially add over 300 hours (five to six weeks) to the construction schedule, which may hinder the ability to complete the closure of Willow Boulevard in one construction season.

Comment 2:

As identified in Section 1 Excavation of the 2009 Consent Decree Statement of Work (SOW), the "Settling Defendant shall excavate the Willow Boulevard Drainageway, the Area South of the A-Site Berm, the Area East of Davis Creek, and the former Olmstead Creek Area to the remedial action goal of 0.33 ppm PCB. The areas to be so excavated are delineated on Figure 2 of the ROD. The Settling Defendants shall excavate these four areas to the 0.33 ppm PCB cleanup goal;..." Based on Figures 2-1, 2-3, 2-4, and 4-1, select portions of the Willow Boulevard Drainageway, the Area South of the A-Site Berm, and former Olmstead Creek Area has been designated as wetlands and will be excavated to the 0.33 ppm cleanup goal and any other portions will be excavated to meet a 6.5 ppm PCB cleanup goal. As indicated above, the Settling Defendants have agreed to excavate the entire Willow Boulevard Drainageway, the Area South of the A-Site Berm, the Area East of Davis Creek, and the former Olmstead Creek Area to the remedial action goal of 0.33 ppm PCB. The Preliminary Design Report and Construction Drawings do not reflect this agreement of the Consent Decree.

Response:

The application of the 0.33 mg/kg criterion was discussed in a teleconference held with USEPA and MDNRE on August 25, 2010. ARCADIS and Georgia-Pacific agreed that all areas within the Willow Boulevard Drainageway that are not managed by capping would be excavated to a cleanup criterion of 0.33 mg/kg. The agreement to apply this number to a larger area than described in the Preliminary Design Report does not constitute Georgia-Pacific's concurrence with USEPA or MDNRE that it is appropriate to apply a sediment criterion to upland soils for any reason, nor does it signify concurrence with USEPA or MDNRE concerning the application of this criteria to soils. Georgia-Pacific does not believe the application of the 0.33 mg/kg sediment criterion to soils is technically valid.

The attached figure shows the updated proposed excavation areas and limits of the cap within the Willow Boulevard Drainageway, assuming excavation to a 0.33 mg/kg criterion. The revised extent of excavation includes one additional area around sample location WB09-09 that was previously excluded based on application of the 6.5 mg/kg criterion, as the maximum PCB concentration in this sample is 0.59 mg/kg. The extent of excavation may also be revised as applicable in the Pre-Final Design Report.

As requested, Section 3.1.1.1 has been revised to reflect the above as follows:

As described in the Remedial Design Work Plan for the OU (RD Work Plan; ARCADIS 2010a), soil remediation is anticipated to occur primarily on property owned by Georgia-Pacific that is zoned for light industrial use – as a result, the Part 201 Generic Residential Land Use Criterion of 4 mg/kg for PCBs in soil is not a basis of design for the remedial action. The PCB criterion that is the basis of design for the Willow Boulevard Drainageway, the area south of the A-Site berm, and the area east of Davis Creek is the sediment cleanup criterion of 0.33 mg/kg, as stated in the ROD. For the area near monitoring well AMW-3A, the basis of design is 6.5 mg/kg PCB, which is the lower end of the No Observed Adverse Effect Level range identified above.

Considering the 0.33 mg/kg criterion may be difficult to achieve, it is the understanding of Georgia-Pacific and ARCADIS that if USEPA determines that the 0.33 mg/kg PCB remediation goal has not been achieved in a particular area, USEPA will consult with MDNRE and Georgia-Pacific regarding (1) whether additional remedial actions will be effective in achieving the 0.33 mg/kg remediation goal in the area; and (2) the potential nature of such additional remedial

actions. Additional remedial actions to be considered include, but are not limited to: (1) additional excavation; (2) backfilling with clean material; (3) capping; and (4) monitored natural attenuation. In determining whether and how to proceed with additional remedial activities, USEPA will consider the extent and concentration of the remaining PCBs in the area(s).

Comment 3:

As identified in Section 1.1 Setback from Kalamazoo River at the Willow Boulevard Landfill of the SOW, "The excavation along the northern banks of the Willow Boulevard Landfill (along the Kalamazoo River) shall be of sufficient distance to create an adequate buffer zone, which ensures that, for the lifetime of the remedy, there is no direct contact between the contaminated residuals within the landfill and the Kalamazoo River. This buffer will also be adequate to prevent PCBs from migrating (by surface water runoff or erosion) from the landfill into the Kalamazoo River. The excavated areas shall be backfilled with clean soil with sufficient organic content to support restoration planting materials and to create an ecologically friendly bank. Additionally, this buffer zone or setback shall be of sufficient size to allow for the installation of and access to groundwater monitoring wells." The preliminary design presented in the Preliminary Design Report and Construction Drawings do not meet this requirement of the SOW.

Response:

To prepare the northern and western slopes of Willow Boulevard for the proposed cover system, it will be necessary to excavate a minimum of 14 feet horizontally back from the edge of the Kalamazoo River (to get down below the base of existing paper-making residuals). In doing so, approximately 6,500 cy of material – including, to a practical extent, all residuals in this 14-foot buffer zone – will be removed from around the northern perimeter of the Willow Boulevard Landfill adjacent to the Kalamazoo River. This excavation will allow for the 3.5-foot thick cover system to be laid at a slope of 25% along the perimeter and the placement of approximately 6,000 cy of clean fill. The proposed final slopes of the northern and western perimeter of the Willow Boulevard Landfill will be able to accommodate equipment to install and access the necessary groundwater monitoring wells – the ability to successfully work on slopes of 25% was proven during the pre-design investigation boring installation along the northern berm. This is described in more detail below.

The buffer zone created by excavation to the required slopes will create a zone approximately 14 feet wide along the river that will be free of residuals. The cover system, which will be constructed over the regraded slope as well as the materials excavated and consolidated in the center of the landfill, will include 12 inches of sand, an impermeable membrane, geosynthetic drainage composite, 24 inches of soil and stone, and a 6-inch vegetative soil layer. The cover system will provide an impermeable barrier between the Willow Boulevard Landfill and the Kalamazoo River, and is designed to achieve the objectives of ensuring "no direct contact between the contaminated residuals in the landfill and the Kalamazoo River" and preventing erosion and runoff of PCB-containing paper-making residuals into the river, as described in the ROD and SOW.

To address the collection of representative groundwater samples from the wells installed along the northern and western perimeter of Willow Boulevard, the use of double-cased wells is proposed. Double-cased groundwater monitoring wells will be installed in a manner similar to that used for other wells (i.e., WMW-3A) installed through paper-making residuals at the Willow Boulevard Landfill during the Remedial Investigation (RI). No PCBs were detected in two rounds of groundwater samples collected from WMW-3A during the RI in 1996 and 2000, proving the double-case technology can accommodate installation of monitoring wells through paper-making residuals. USEPA stated a concern that installation of monitoring wells through paper-making residuals may compromise the interpretation of groundwater sample results; however, no specific rationale was explained. ARCADIS believes the available data for the OU specifically and the Site in general provide proof of the reliability of this approach – double-cased wells have been

installed and monitored successfully at numerous locations at the landfill OUs of the Superfund Site. Further, if there were a detection of PCBs at a double-cased well believed to be associated with the temporal impacts of well construction, this result could be differentiated by completing a trend analysis of the data.

During the teleconference with USEPA and MDNRE on August 25, 2010, USEPA expressed concern that the proposed approach for construction of the buffer zone was not consistent with the ROD, and that it would not allow installation of reliable monitoring wells. ARCADIS asserts that the construction approach as described is consistent with the ROD. The ROD does not require a particular size, shape, or configuration of the buffer zone. Nor does it state that the monitoring wells cannot pass through residuals, rather the ROD only requires that the buffer be sufficient to allow installation of the wells and future access to the wells. The configuration as proposed in the Preliminary Design Report provides an adequate buffer zone to satisfy the requirements of the ROD.

ARCADIS has evaluated several alternative approaches to address the agency's concerns about installing the groundwater wells through paper-making residuals. These alternatives include the following:

- Localized excavation and clean backfill only around the proposed groundwater monitoring wells, with the cover system being retained along the full slope. In this option, it is likely that the monitoring wells would be moved downslope to minimize the additional excavation volumes, and it is estimated that an additional 1,000 to 2,000 cy of material would need to be removed. This option has several drawbacks. First, established groundwater flow pathways would be changed. Preferential pathways to groundwater may result from backfilling the excavations with a material having a higher hydraulic conductivity property than paper-making residuals. Another issue is the complications associated with excavation below the water table. A portion of the excavated material would be taken from below the water table to reach the approximate bottom of residuals in this area. It is well established that excavating below the water table causes mixing between materials targeted for removal and native materials. This creates uncertainty as to the nature and extent of residuals after excavation, and may unintentionally expand the affected area. Additional problems arise with the management of river water, stormwater, and leachate that could collect in the open excavation. The management of water collected in the open excavation would further mix/disturb the base of the excavation and potentially impact the clean soils installed during backfilling operations.
- Excavation back from the shoreline by varying distances along the perimeter of the Willow Boulevard Landfill, and backfilling to achieve a 3:1 slope to top of berm (in this option the cover system would terminate at the top of the berm). As with the previous option, the groundwater monitoring wells would likely be moved downslope to minimize excavation. It is estimated that this option would still result in the excavation of an additional 8,500 cy of material, which would have cost and schedule implications for the project. Similar to the localized excavation option, the existing groundwater flow paths will be altered, excavation would need to be performed down below the water table (thus raising issues of mixing between impacted and non-impacted materials), and there would be an increased need to manage and control river water, stormwater, and leachate.

In contrast to the situation at A-Site, where berms were constructed for dewatering lagoons thus establishing a 'clean' buffer before the placement of paper-making residuals was initiated, Willow Boulevard Site was created by placing paper-making residuals within a backwater area of the Kalamazoo River. Over time, the paper-making residuals (not all of which contain measureable levels of PCBs) have become stable, and based on the results of the Remedial Investigation, we have an understanding of the nature and extent of PCB impacts. To disrupt this setting alters our understanding of the nature and extent of PCB-impacted materials, creates unnecessary

uncertainties, and potentially could expand the extent of PCB into areas that are not currently affected.

Although both of the above options may be viable to incorporate into the design, Georgia-Pacific and ARCADIS assert that the current conditions at Willow Boulevard Site are stable and should not be disturbed. The installation of monitoring wells into unknown subsurface conditions has a greater potential to compromise the interpretation of groundwater data than the installation of double-cased monitoring wells through delineated residuals. Furthermore, ARCADIS believes that it is more reliable to monitor beneath the established interface between waste and native materials as proposed in the Preliminary Design Report.

Georgia-Pacific and ARCADIS believe the current design meets the intent of the setback as described in the ROD and SOW, which is to: 1) isolate the paper-making residuals from the River, 2) prevent erosion and run-off of PCB-containing materials, and 3) provide for the installation and access of monitoring wells. The current design adequately meets these requirements.

**Georgia-Pacific LLC
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Willow Boulevard/A-Site Landfill Operable Unit 2**

**Table 1- Alternative Options for Consolidation of Material at the Willow Boulevard and A-Site Landfills in Response to
USACE/CH2M HILL and MDNRE Comments on the Preliminary Design Report, July 2010**

Alternative	Acreage of Final Cover System/Reduction in Extent of Residuals at Willow Boulevard Landfill ¹	Estimated Peak Elevation of Willow Boulevard Landfill ²	% Change in Volume Consolidated at Willow Boulevard Landfill ^{1,3}	Acreage of Final Cover System/Reduction in Extent of Residuals at A-Site Landfill ⁴	Estimated Peak Elevation of A-Site Landfill ²	% Change in Volume Consolidated at A-Site Landfill ³
Consolidation of material at Willow Boulevard and A-Site (Current Design)	9.4/1.6	781.5	0	16.9/5.1	803.3	0
Consolidation of all material at A-Site	9.4/1.6	779.5	-100%	16.9/5.1	803.3	+15%
Consolidation of material at Willow Boulevard and A-Site and leave sheet pile wall in place	9.4/1.6	781.5	0	16.9/5.1	793.3	-52%
Consolidation of all material at A-Site and leave sheet pile wall in place	9.4/1.6	779.5	-100%	16.9/5.1	793.3	-37%

Notes:

1. Current extent of residuals at Willow Boulevard is approximately 11 acres (including the Willow Boulevard Drainageway). Current extent of residuals at A-Site is approximately 22 acres (including the area south of A-Site berm, area east of Davis Creek, and area near monitoring well AMW-3A).
2. Estimated peak landfill elevation includes final cover system thickness of approximately 3.5 feet.
3. The current Preliminary Design assumes that 13,000 cy of material would be excavated from Willow Boulevard and 87,000 cy would be excavated from A-Site. 45,000 cy of the material excavated from A-Site is estimated to be in conjunction with removal of the sheet pile wall. The percentage change indicated is the change from the current design volume of excavation to be consolidated at each site to the potential alternative.
4. The final cover area for A-Site assumes that the final cover system is terminated within the perimeter berm adjacent to the sheet pile wall as shown in the current design concept. Alternatively, the final cover system could be extended out to sheet pile, which could reduce the peak elevation of the landfill. In doing this however, a buffer of clean material for monitoring well installation adjacent to the sheet pile wall would not be provided and double-cased well technology would need to be incorporated.

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
WILLOW BOULEVARD/A-SITE LANDFILL OPERABLE UNIT 2 REMEDIAL DESIGN

**RESPONSES TO USEPA REQUEST FOR ADDITIONAL DATA
WILLOW BOULEVARD/A-SITE LANDFILL OPERABLE UNIT 2**

PCB Concentrations of Material being Consolidated at the Operable Unit:

The attached figures, which were provided in the Preliminary Design Report, have been marked up by hand to identify those areas of the Operable Unit (OU) where excavation/major regrading is proposed and the extent of the proposed cover system for both landfills. The areas of excavation, the extent/footprint of residuals and PCB-containing materials after excavation, and the footprint of the final cap/cover systems will not change, regardless of where the materials are ultimately disposed.

Description of Containment System:

The components of the cover system would not change from that described in the Preliminary Design Report if all excavated materials are transported for consolidation at the A-Site Landfill. A cover system would still be incorporated into the design at each landfill in either case as specified in the Description of the Selected Remedy in the Record of Decision (ROD).

As detailed in Section 4.4 of the Preliminary Design Report:

“A final cover system will be installed at the WB/A-Site OU to isolate PCB-containing materials within the two landfills. The design of the cover system will be in compliance with the relevant requirements and cover system specifications for closure of a solid waste disposal facility included in Part 115 Solid Waste Management, of the NREPA. The cover system will be constructed to isolate PCB-containing material by minimizing contact through surface water runoff or erosion and infiltration of precipitation through the landfills. The objectives of installing the cover system are to minimize and control PCB migration from the landfills into the groundwater and the Kalamazoo River, mitigate human or ecological exposures to PCB-containing residuals within the landfills, and minimize erosion of the final vegetated surface. The cover system will consist of the following layers, from bottom (below grade) to top (surface):

- A 12-inch (minimum) sand gas venting layer*
- A 40-mil LLDPE FML*
- A geosynthetic drainage composite (GDC)*
- A 24-inch (minimum) soil protection layer*
- A 6-inch (minimum) vegetated topsoil layer.....*

..... The components of the final cover system are depicted on Construction Drawing 13 – Final Cover Section and Details.”

Description of the Proposed Monitoring Plan

The groundwater monitoring program would not change from that described in the Preliminary Design Report if all excavated materials are transported for consolidation at the A-Site Landfill. Because the extent/footprint of residuals and PCB-containing materials would remain the same regardless of where the excavated/consolidated materials are ultimately disposed, the groundwater monitoring well locations would also not be altered from those presented in the Preliminary Design Report.

As detailed in Sections 4.5 and 5.2.1 of the Preliminary Design Report:

"The groundwater monitoring network will include 27 monitoring wells: 24 downgradient monitoring wells installed in 2-well clusters at 12 locations, and 3 upgradient monitoring wells (Figure 4-3). The downgradient monitoring wells will be installed within the groundwater flow path from the residuals toward the downgradient surface water bodies (Davis Creek and the Kalamazoo River). At each of the 12 downgradient monitoring well cluster locations, two wells will be installed, one shallow well screened across the water table and a deeper well screened to intercept flow approximately 10 feet below the bottom of the shallower well (See Construction Drawing 18 – Groundwater Monitoring Well Details). The upgradient monitoring wells will be located at the east end of Charleston Ave (at the former location of monitoring well AMW-3), near St. Joes Avenue and by Willow Boulevard (Figure 4-3). The upgradient monitoring wells will be screened across the water table to aid in the interpretation of collected groundwater elevation data and downgradient water quality data. To minimize the potential to pull residual material downward to the screened well depths during the drilling process, an outer well casing will be grouted in place to the anticipated depth of the bentonite seal above the well sand pack at each location. The inner well casing will then be installed inside the outer casing. Based on existing subsurface information, residuals are not expected to be present at the depths of proposed screen placement. In the event that residuals are encountered, the corresponding well(s) will be installed a minimum of five feet below the base of the encountered residuals. This procedure will be followed as an additional measure to guard against the detection of compounds during future groundwater sampling events that have been artificially mobilized by drilling or sampling activities. As shown on Construction Drawing 7 – Groundwater Monitoring Well Plan, the downgradient monitoring well clusters will be installed with an approximate spacing of 300 feet.

All existing monitoring wells (which are not anticipated to be used for the groundwater monitoring program) will be abandoned prior to construction.....

.....Upon completion of construction activities, a groundwater monitoring program will be implemented and will continue until USEPA determines that it is no longer necessary. This program will be evaluated during the five-year project review and during each subsequent review, as required under the National Contingency Plan, 40 Code of Federal Regulations Part 300 (as amended).

The groundwater monitoring program, as described in Section 4.5, will require installation of additional monitoring wells along the A-Site Berm and Willow Boulevard setback, and upgradient of the area of residuals that will remain in place. A series of proposed monitoring locations is presented in the Groundwater Monitoring section of the Performance Standards Verification Plan (included in draft form as Appendix G). Groundwater monitoring will be conducted in accordance with Part 201, Environmental Remediation, of the NREPA."

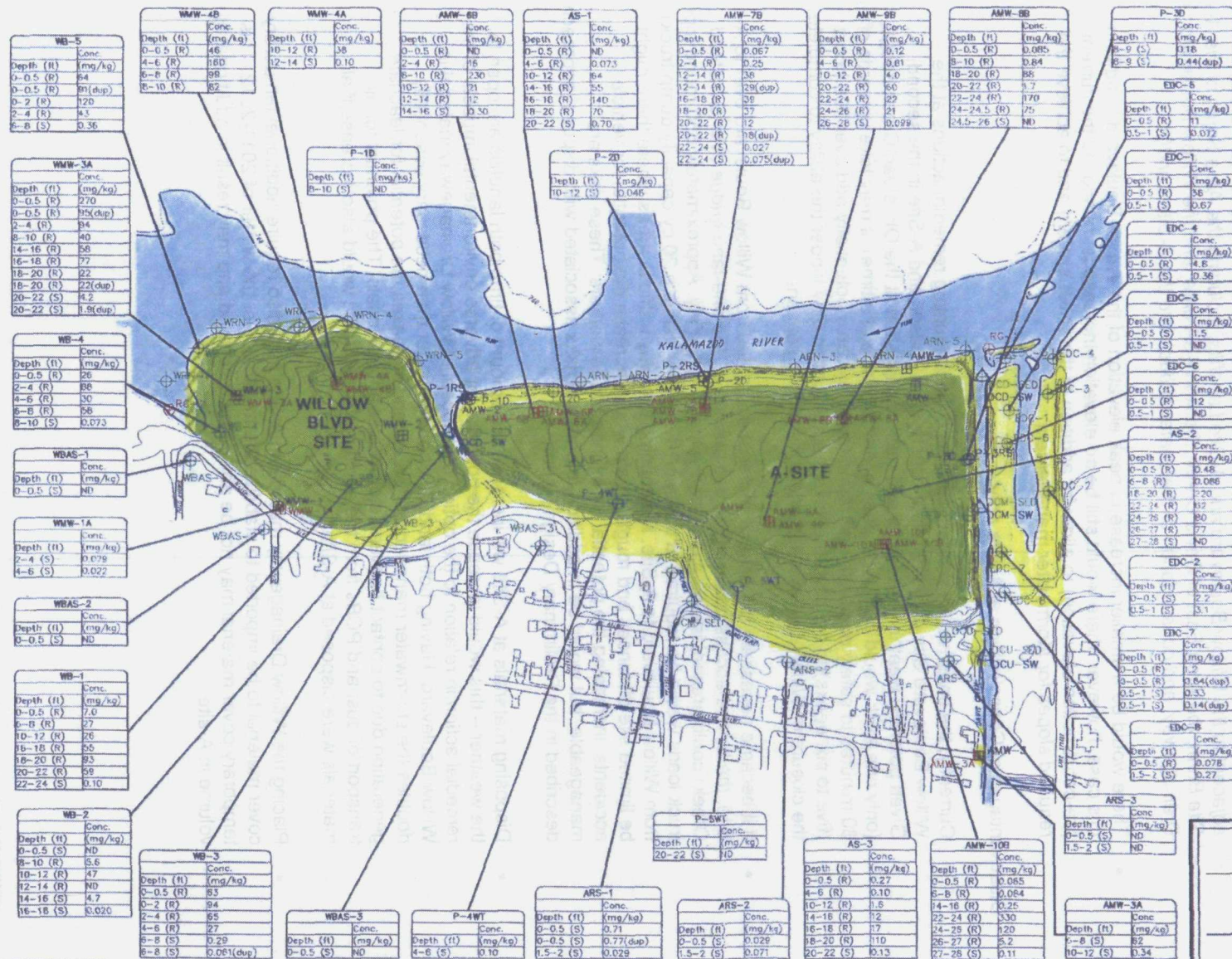
Advantages/Disadvantages of Consolidation at A-Site Landfill Only

Advantages of Consolidation at the A-Site Landfill only:

- It would be consistent with language in the ROD which states that *"Excavation of approximately 13,800 cubic yards (cyd) of PCB-contaminated material from areas adjacent to the Willow Boulevard and A-Site Landfills, including the Area South of the A-Site Berm, the Area East of Davis Creek, the AMW-3A area, and the Willow Boulevard Drainageway, and consolidation of that material back into the A-Site Landfill."*
- There would be a smaller increase in peak elevation of the Willow Boulevard Landfill in this case; however, there would still be an elevation increase (in relation to the current, pre-construction elevation) to allow for addition of the cover system and to achieve the required slopes for stormwater management.

Disadvantages of Consolidation at A-Site only:

- Currently, the construction schedule is based on conducting remedial actions at the Willow Boulevard Site during the first construction season and A-Site in the second. Given potential weather conditions and traffic congestion at the Olmstead Creek bridge (only one truck would be able to pass over the bridge at a time), it may take upwards of 30 minutes to safely complete one round trip. This could potentially add over 300 hours (five to six weeks) to the construction schedule, which may hinder the ability to complete the closure of Willow Boulevard in one construction season.
- If it became necessary to transport material excavated from Willow Boulevard over to A-Site, the limited access between the two areas (i.e., the one-lane bridge over Olmstead Creek) could present issues associated with worker safety. Approximately 650 round trip truck loads would be required to transport 13,000 cy (using a 20 cy capacity dump truck) from Willow Boulevard to A-Site. Maintaining two-way traffic in areas where there might be limited site distances and rough terrain would increase the potential for vehicle accidents, increasing the potential for injuries to site workers. These risks are manageable, but would be in addition to potential risks associated with disposal approach described in the Preliminary Design Report.
- Disposing materials at A-Site will increase the amount of time both landfills are open to the weather – this would increase the potential for adverse environmental impacts of the remedial action in relation to the option of disposal of Willow Drainageway material in Willow Boulevard. Having both landfills open for longer than necessary essentially doubles the stormwater management issues and increases the potential for leachate generation due to contact between stormwater and residuals. The potential for air transport of dust and PCBs from the additional truck traffic would also increase if all materials were disposed at A-Site.
- Placing the Willow Drainageway material in A-Site may also require additional temporary cover material to be imported to stabilize the material over the winter of 2011-2012. This temporary cover material may not be able to be recovered and may result in additional fill volume in A-site.



- LEGEND**
- AMW-4 EXISTING MONITORING WELL
 - WB-3 NEW MONITORING WELL OR CLUSTER
 - WB-1 NEW BURNING
 - GEO-1 NEW GEOTECHNICAL BORING
 - P-20 NEW PIZOMETER
 - SW-1 NEW SURFACE WATER SAMPLE
 - RC-1 NEW RIVER GAUGE STATION
 - ELEVATION CONTOUR (NOV 1970)
 - EDGE OF WATER OR DRAINAGE CHANNEL
 - UNPAVED ROAD/RAIL
- NOTES:**
- UNLESS OTHERWISE INDICATED ALL SAMPLE LOCATIONS SURVEYED BY WILCOX, INC. OCTOBER 1993 THROUGH JANUARY 1994. SAMPLES ARN-1 THROUGH ARN-5 AND WBN-1 THROUGH WBN-5 WERE SURVEYED BY BLASLAND, BOUCK & LEE, INC. JULY 1993.
 - TOPOGRAPHIC MAPING PRODUCTS USING PHOTOGRAMMETRIC METHODS BY LOCKWOOD, INC. FROM AERIAL PHOTOGRAPHY FROM APRIL 1991. TOPOGRAPHIC CHANGES AFTER APRIL 1991 ARE NOT SHOWN.
 - SAMPLE RESULTS AS REPORTED BY ADJUTANT, INC. 1993, 1994.
 - DATA REFLECTS TOTAL PCB DERIVED FROM THE SUM OF INDIVIDUAL ARDOLORS. ARDOLOR SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLE 2.
- EXTENT OF PROPOSED EXCAVATION/REGRAVING FOR PLACEMENT OF CAP**
- EXTENT OF CAP PLACEMENT**



- NOTES:**
- UNLESS OTHERWISE INDICATED ALL SAMPLE LOCATIONS SURVEYED BY WILCOX, INC. OCTOBER 1993 THROUGH JANUARY 1994. SAMPLES ARN-1 THROUGH ARN-5 AND WBN-1 THROUGH WBN-5 WERE SURVEYED BY BLASLAND, BOUCK & LEE, INC. JULY 1993.
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 - DATA REFLECTS TOTAL PCB DERIVED FROM THE SUM OF INDIVIDUAL ARDOLORS. ARDOLOR SPECIFIC RESULTS AND THEIR QUALIFIERS CAN BE FOUND IN TABLE 2.

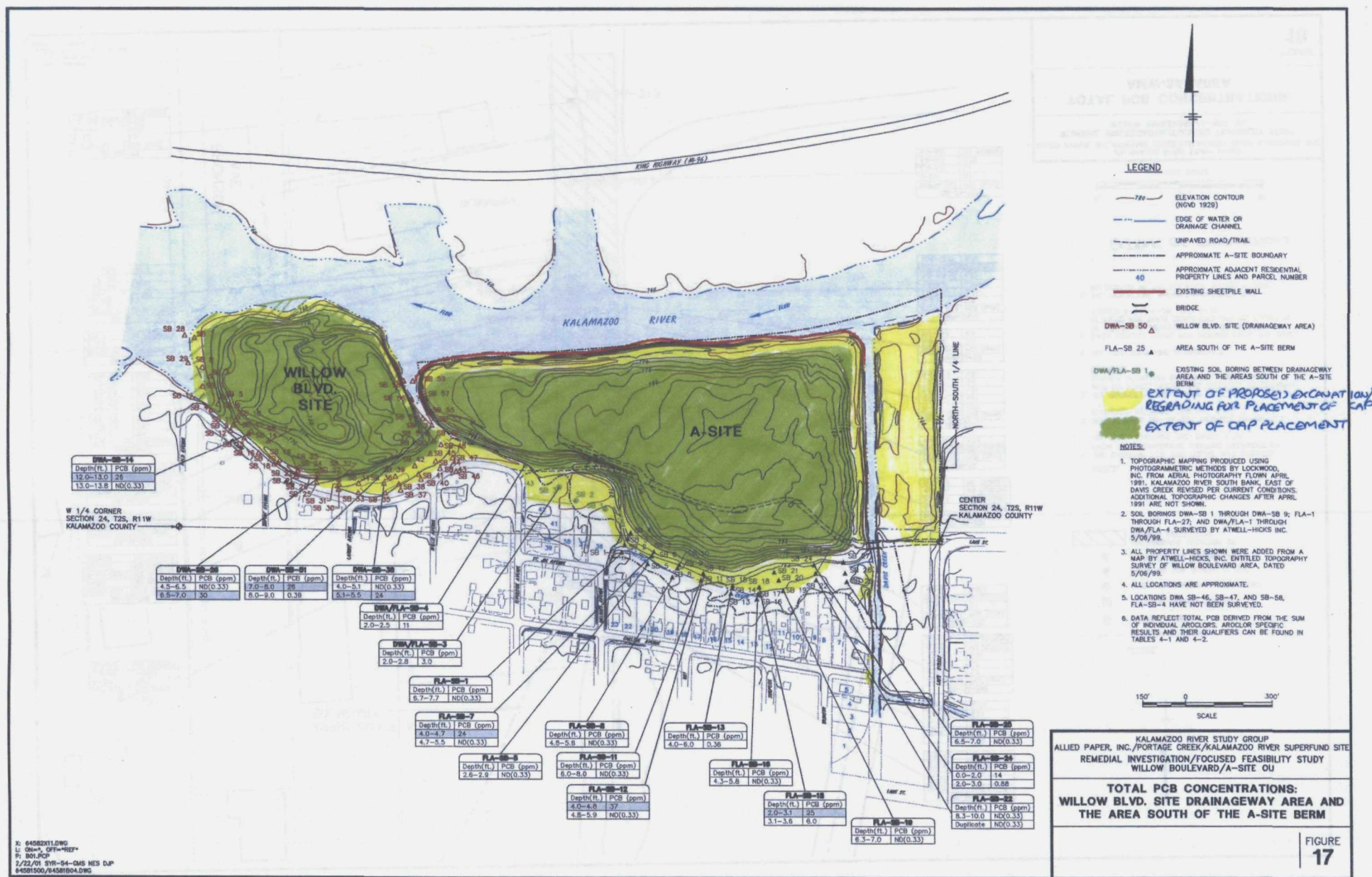
KBS0204089

BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

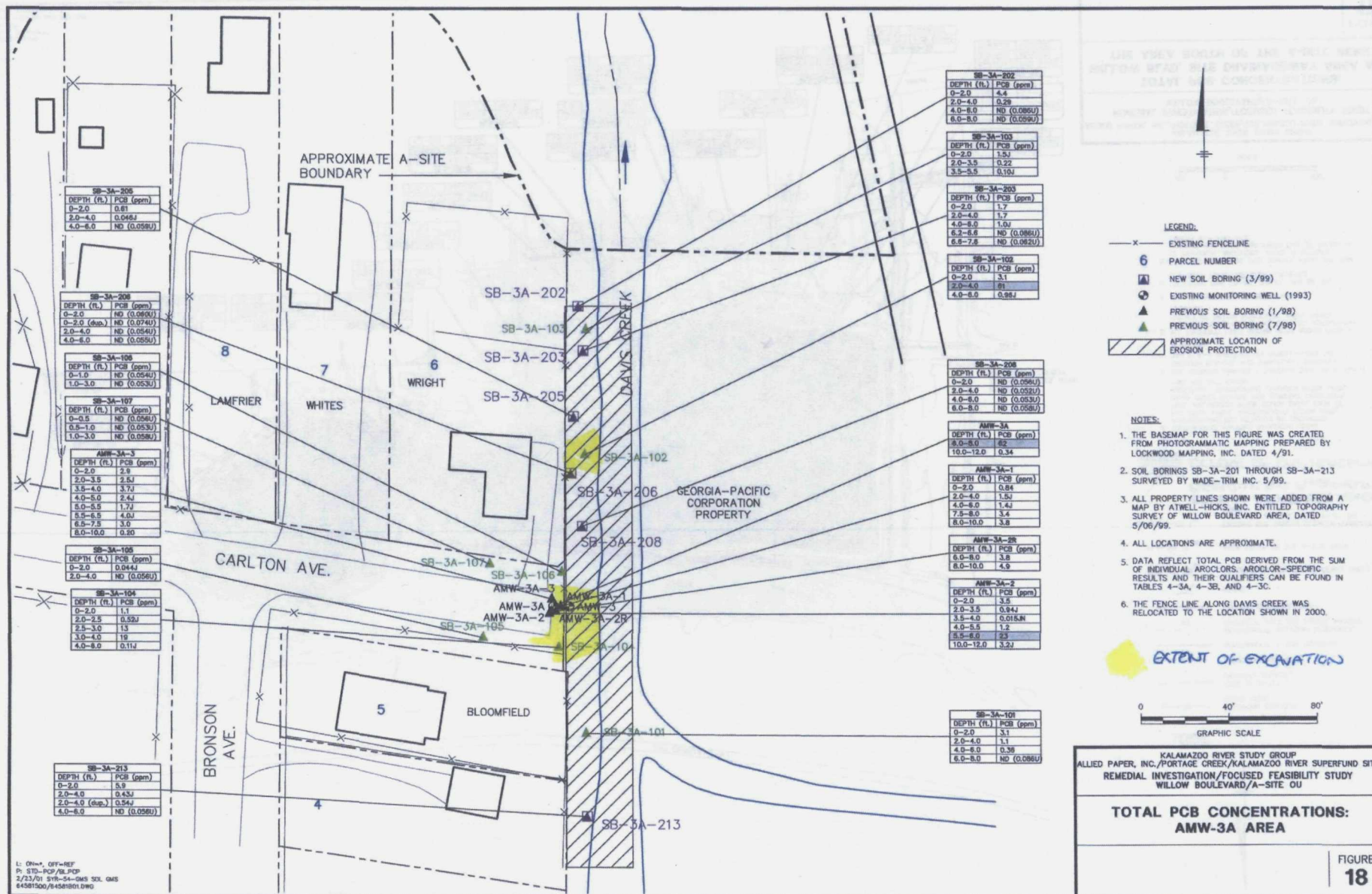
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC. / PORTAGE CREEK / KALAMAZOO RIVER SUPERFUND SITE
TECHNICAL MEMORANDUM 9
WILLOW BOULEVARD / A-SITE OU

RESIDUALS/SOIL PCB DATA

FIGURE 11

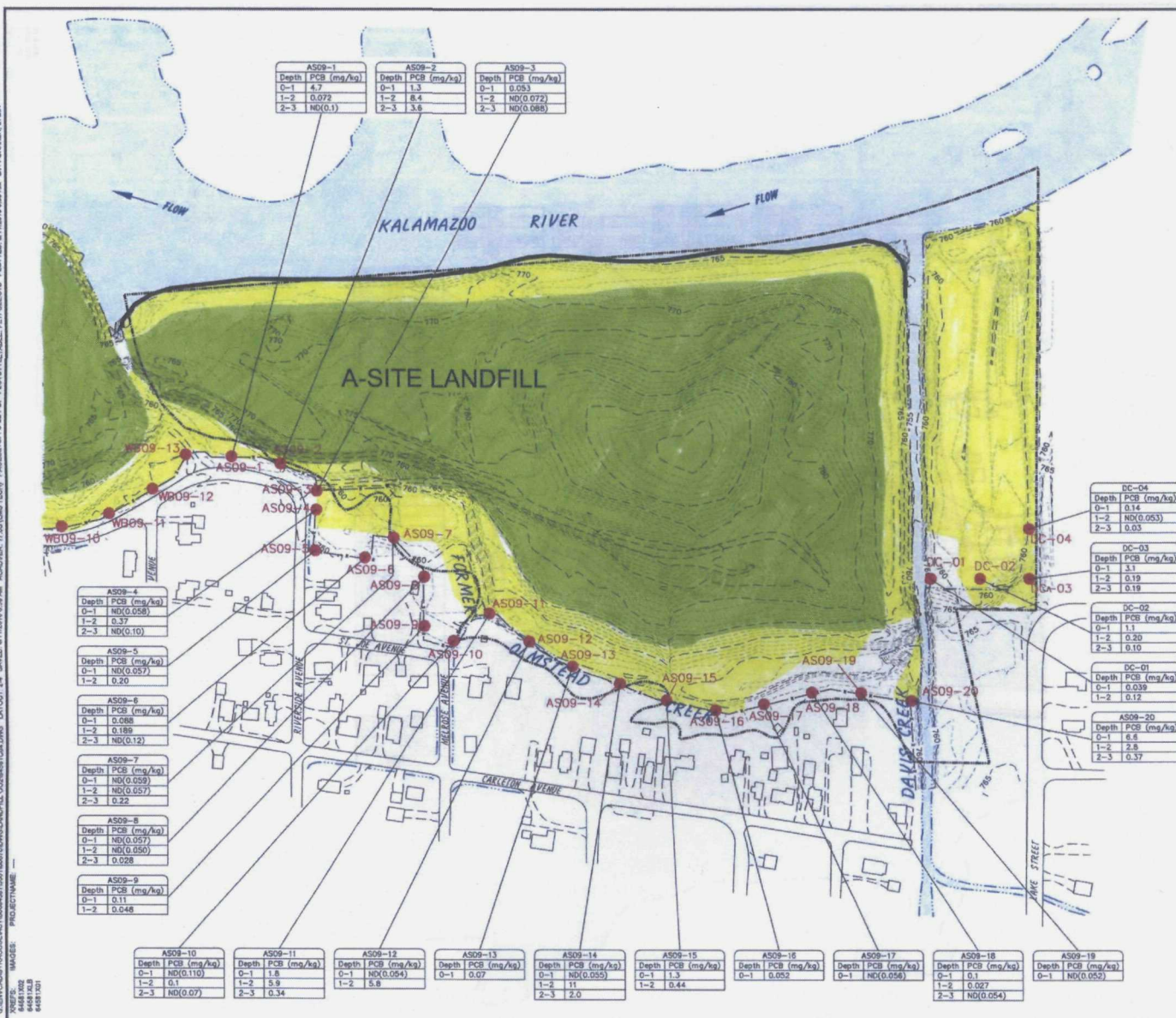


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P: 001.PCP
2/22/01 SYR-04-QMS NES DJP
64581500/64581804.DWG



L: OFFICE, OFF-REF
P: STD-PCP/BL/PCP
2/23/01 BY: SA-005 SOL GMS
64581500/64581801.DWG

CITY OF Kalamazoo, Michigan
 DIVISION OF PUBLIC WORKS
 PROJECT: PRELIMINARY DESIGN REPORT FOR THE A-SITE LANDFILL
 DATE: 11/10/10
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

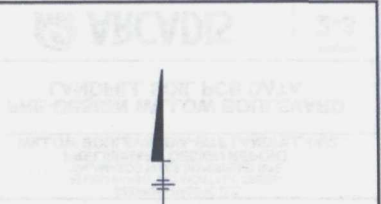


AS09-1	AS09-2	AS09-3
Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)
0-1 4.7	0-1 1.3	0-1 0.053
1-2 0.072	1-2 8.4	1-2 ND(0.072)
2-3 ND(0.1)	2-3 3.6	2-3 ND(0.088)

AS09-4	AS09-5	AS09-6	AS09-7	AS09-8	AS09-9
Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)
0-1 ND(0.058)	0-1 ND(0.057)	0-1 0.068	0-1 ND(0.059)	0-1 ND(0.057)	0-1 0.11
1-2 0.37	1-2 ND(0.10)	1-2 0.189	1-2 ND(0.057)	1-2 ND(0.050)	1-2 0.048
2-3 ND(0.10)	2-3 ND(0.12)	2-3 ND(0.12)	2-3 0.22	2-3 0.028	2-3 0.048

AS09-10	AS09-11	AS09-12	AS09-13	AS09-14	AS09-15	AS09-16	AS09-17	AS09-18	AS09-19
Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)
0-1 ND(0.110)	0-1 1.8	0-1 ND(0.094)	0-1 0.07	0-1 ND(0.035)	0-1 1.3	0-1 0.052	0-1 ND(0.058)	0-1 0.1	0-1 ND(0.052)
1-2 0.1	1-2 5.9	1-2 5.8	1-2 0.07	1-2 11	1-2 0.44	1-2 0.052	1-2 ND(0.058)	1-2 0.027	1-2 ND(0.052)
2-3 ND(0.07)	2-3 0.34	2-3 5.8	2-3 0.07	2-3 2.0	2-3 0.44	2-3 0.052	2-3 ND(0.058)	2-3 ND(0.054)	2-3 ND(0.052)

DC-04	DC-03	DC-02	DC-01	AS09-20
Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)	Depth PCB (mg/kg)
0-1 0.14	0-1 3.1	0-1 1.1	0-1 0.039	0-1 6.6
1-2 ND(0.053)	1-2 0.19	1-2 0.20	1-2 0.12	1-2 2.8
2-3 0.03	2-3 0.19	2-3 0.10	2-3 0.10	2-3 0.37



- LEGEND:**
- ELEVATION CONTOUR (NGVD 1929)
 - EDGE OF WATER OR DRAINAGE CHANNEL
 - UNPAVED ROAD/TRAIL
 - APPROXIMATE A-SITE LANDFILL BOUNDARY
 - EXISTING SHEET PILE WALL
 - EXISTING FENCELINE
 - AS09-7 ● PCB SAMPLE LOCATION
 - EXTENT OF PROPOSED EXCAVATION/REGRADING FOR PLACEMENT OF CAP
 - EXTENT OF CAP PLACEMENT
- NOTES:**
- BASE MAP INFORMATION WAS DEVELOPED FROM FIELD SURVEY DATA OBTAINED BY PREIN & NEWHOFF IN DECEMBER 2009, MAY 2007, MAY 2006, AND AERIAL PHOTOGRAPHY FLOWN IN APRIL 1991.
 - ALL LOCATIONS ARE APPROXIMATE.
 - SAMPLES COLLECTED IN FEBRUARY 2010.

GEORGIA-PACIFIC LLC
 ALLIED PAPER, INC./PORTAGE CREEK/
 KALAMAZOO RIVER SUPERFUND SITE
 PRELIMINARY DESIGN REPORT
 WILLOW BOULEVARD/A-SITE LANDFILL OU2

**PRE-DESIGN A-SITE LANDFILL
 SOIL PCB DATA**

ARCADIS

FIGURE
2-4